

up the protruded portion 34, which will generate an abnormal noise.

In addition, in a case where the cartridge 35 is largely shifted in its position because of play or like, the movement of the cartridge becomes impossible when the protruded portion 34 collides with the housing 36, and hence, the mechanism for loading or unloading the cartridge may be entirely locked, also providing a problem.

Furthermore, at the cartridge loading or unloading time, since the protruded portion 34 always urges the side wall of the cartridge 35, there is a fear of unstable loading or unloading of the cartridge 35.

An object of the present invention is therefore to substantially eliminate defects or drawbacks encountered in the prior art mentioned above and to provide a shutter opening/closing mechanism capable of automatically opening or closing a shutter in accordance with the loading or unloading of a cartridge and being free from generation of abnormal noise and backlash without giving any influence to the cartridge loading or unloading operation.

Means for solving The Problem

In order to solve the above problem, a shutter opening/closing apparatus of claim 1 comprises a follower member (18) configured to be engaged, through an opening (11) of a cartridge (10), with a recessed portion of a wheel (13) for opening or closing a shutter of the cartridge; and a cam mechanism (7, 7a) for controlling a movement of the follower member so as to avoid contact of the follower member to a body (10a) of the cartridge at a time when the engagement between the follower member and the recessed portion (13c) is released.

A shutter opening/closing apparatus of claim 2 comprises a follower member configured to be engaged, through an opening of a cartridge, with a recessed portion of a wheel for opening or closing a shutter of the cartridge; and a cam mechanism for limiting a movement of the follower member at a time when the cartridge is loaded and disposed between the follower member and the cartridge at a position at which the follower member does not engage with the recessed portion of the wheel.

Further, in the present invention, the shutter opening/closing apparatus may further include urging means (17) for urging the follower member toward the cartridge.

Brief Description of The Drawings

[Fig. 1] is a perspective view showing an information reproducing apparatus and a cartridge having conventional structures.

[Fig. 2] shows a perspective view of a shutter opener of conventional structure.

[Fig. 3] includes (a) to (d) representing a series of shutter opening or closing operation according to the conventional structure.

[Fig. 4] includes (a) and (b) representing an operation of the shutter opening or closing operation of at an essential portion of the cartridge in an enlarged scale.

[Fig. 5] is a developed perspective view of a cartridge according to one embodiment of the present invention.